

SPECIFICATION

TO ALL WHOM IT MAY CONCERN:

5 Be it known that DWIGHT W. LOHR, a citizen of the United States of
America, resident of Upper Sandusky, County of Wyandot, State of Ohio, and
JAMES B. BROWN, a citizen of the United States of America, resident of
Lakewood, County of McHenry, State of Illinois, have invented a new and
useful improvement in a

10

COMPOSITE HINGED-DOOR AND INSERT THEREFOR

which invention is fully set forth in the following specification.

15

COMPOSITE HINGED DOOR AND INSERT THEREFOR

CROSS-REFERENCE TO RELATED APPLICATION

5 This application is based on provisional application No. 60/520,878, which was filed on November 18, 2003.

FIELD OF THE INVENTION

10 This invention relates to the construction of an upwardly acting or roll-up door that is made up of a series of a composite panels with adjacent panels in the series being hinged to one another. More particularly, this invention relates to a panel construction for such a door with a hard, durable insert that extends partly from such panel to be received in a recess of an adjacent panel when the panels are aligned with one another in a straight line, and to the
15 insert for use in such a composite, hinged door.

BACKGROUND OF THE INVENTION

 Upwardly acting doors with a series of hinged panels to impart
20 flexibility to each such door are known in the art and are extensively used in garages and warehouses, especially warehouses with high clearance, and in truck bodies. U.S. Patent Application Publication Nos. 2002/0056528A1 and 2002/0139490A1 each discloses a known type of upwardly acting door that has a series of panels hinged to one another. For purposes of aligning
25 adjacent panels in a hinged door when the door is closed, it is important that each panel have an edge with a projection or tongue that is received in a groove or recess of an edge of the adjacent panel in the series when the panels are aligned in a straight line. U.S. Patent 3,334,681 (Crosswell) is an example of a prior art reference that teaches such a feature.

30 The panels of many roll-up doors, as heretofore described, are now often constructed of a plurality of materials, with a thicker central layer of a lighter weight material, sandwiched between inner and outer layers of

thinner, but heavier, metallic structural materials, such as sheets of aluminum or steel. Such construction helped to reduce door weight for a given door thickness while providing sufficient rigidity to the door, and it serves to reduce heat and/or noise transfer through such door, when closed.

5 In these cases, it is important that the tongue and groove connection between adjacent panels in a series of hinged panels be solely between the central layers of such panels, but the lightweight materials that are now preferred for such hinged doors tend to be abradable in the region of the tongues of the door panels, which detracts from the precision of a tongue
10 and groove alignment feature in a hinged-panel door over a prolonged duration of frequent openings and closings.

BRIEF DESCRIPTION OF THE INVENTION

15 A composite hinged door according to the present invention, which was designed specifically to serve as an upwardly acting or roll-up rear door for a truck body, comprises a series of composite panels in which adjacent panels are hinged to permit the panels to articulate with respect to one another during the opening of the door. Each panel is of composite construction, with a
20 central layer of a lightweight material, such as a plastic material, that is sandwiched between inner and outer layers of a sheet metal, the central layer imparting rigidity and heat and/or noise insulating properties to each door panel and the inner and outer layers imparting strength and impact resistance to each panel. A hard, durable insert is embedded in a recess in a edge of the
25 central layer of a panel with a portion of such insert extending beyond the edge of the panel. The extending portion of the insert is received in a recess or groove in an edge of an adjacent panel when the panels are aligned in a straight line in a closed door, to maintain proper alignment between the adjacent panels. The portion of the insert that extends into the recess of the
30 adjacent panel is much more resistant to abrasion or wear than would be a protruding tongue of a typical central layer of a composite, hinged panel door,

which thereby extends the duration during which adjacent panels can be accurately aligned over many closings of the hinged panel door.

Accordingly, it is an object of the present invention to provide an improved composite, hinged panel door. More particularly, it is an object of the present invention to provide a hinged panel door of the aforesaid character in which accurate alignment of adjacent hinged panels can be maintained over an extended duration of openings and closings of the door. Even more particularly, it is an object of the present invention to provide a hinged panel door of the aforesaid character with an improved tongue and groove locking feature in which the tongue is a portion of a hard, durable material that is highly resistance to abrasion or wear over many openings and closings of the hinged panel door. It is also an object of the present invention to provide in an insert of the foregoing character for such a hinged-panel door.

For a further understanding of the present invention and the objects thereof, attention is directed to the drawing and the following brief description thereof, to the detailed description of the invention and to the appended claims.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is an elevation view of a hinged panel door according to a preferred embodiment of the present invention;

Fig. 2 is a fragmentary sectional view at an enlarged scale, taken on line 2-2 of Fig. 1;

Fig. 3 is a view like Fig. 2 that illustrates the structure of Fig. 2 in different relative positions of certain of the elements thereof; and

Fig. 4 is an elevation view, at an enlarged scale, of an element of the structure of Figs. 2 and 3.

DETAILED DESCRIPTION OF THE INVENTION

A hinged panel door according to a preferred embodiment of the present invention is generally identified by reference numeral 10 in Fig. 1.

The hinged panel door 10 is made up of a vertically extending series of horizontally extending panels, including panels 12 and 14, and adjacent panels in the vertically extending series are hinged to one another, for example, by way of a hinge 16 (Figs. 2 and 3), which permits the panels 12 and 14 to articulate with respect to one another. Each of the panels 12 and 14 is of composite construction, with a thick, central layer of a lightweight material 18, such as a plastic material, sandwiched between thin, inner and outer layers 20, 22, respectively, which are of aluminum or steel sheet. Preferably, the central layer 18 is an expanded or gas injected polyethylene, and the inner and outer layers are of automotive quality galvanized steel, primed and pre-painted. The layers 20, 22 impart strength and impact resistance to the panels 12, 14, and the central layer 18 imparts rigidity and sound and/or thermal transfer resistance thereto.

A hard, durable insert 24, which may be of a ceramic material or PVC, is provided at a juncture of the panels 12, 14 to ensure that the panels 12, 14 accurately align themselves with one another upon the closing of the door 10 when the panel 14 moves relative to the panel 12 from the position indicated in Fig. 3 to the position indicated in Fig. 2. The insert 24 has a shank portion 24a that is permanently embedded in a recess 12a of the central layer 18 of the panel 12. The insert 24 also has an enlarged head portion 24b that extends beyond the inlet to the recess 12a of the central layer 18 of the panel 12. The head portion 24b, which has a tapered edge 24c that is positioned away from the hinge 16 and extends inwardly toward the hinge 16 as it projects outwardly from the panel 12, is received in a recess 14a in the central layer 18 of the panel 14, the recess 14a being in a free edge of the central layer 18 of the panel 14 and being complementally-shaped to the head portion 24b of the insert 24. Thus, when the panel 14 is aligned with the panel 12 in a straight line, as depicted in Fig. 2, the head

portion 24b of the insert 24 will substantially fill the recess 14a of the central layer 18 of the panel 14, and will thereby serve to ensure that the panels 12, 14 align themselves accurately when they move from the relative positions depicted in Fig. 3 to the relative positions depicted in Fig. 2.

The insert 24 also has a spaced, axially extending series of longitudinally extending and outwardly projecting ribs 24c on each of the opposed longitudinally extending surface of the shank portion 24a to help to frictionally retain the insert in the recess 12a. The insert 24 also has a flat free end surface 24d.

Though the best mode contemplated by the inventor(s) for carrying out the present invention as of the filing date hereof has been shown and described herein, it will be apparent to those skilled in the art that suitable modifications, variations, and equivalents may be made without departing from the scope of the invention, such scope being limited solely by the terms of the following claims and the legal equivalents thereof.